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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/714,047

11/13/2003

Gregor Dudziak

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EXAMINER

WATTS, ALLISON LEIGH

ART UNIT

PAPER NUMBER

1753

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

02/08/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/714,047

Applicant(s)

DUDZIAK ET AL.

Examiner

Allison L. Watts

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>7/8/04 and 6/18/04</u> | 6) <input type="checkbox"/> Other: _____ |

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 28,29. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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3. Claims 19-22 and 24-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Sanchez et al.

As to Claim 19, Sanchez et al. disclose an appliance for membrane electrophoresis comprising an at least quadripartite separation chamber (Figure 1) having a diluate space, a concentrate space (4, 5), an anode space, and a cathode space (8, 9), having electrodes as the anode and cathode (column 5, lines 9-11); the spaces separated by porous membranes (2, 3), especially ultrafiltration or microfiltration membranes (column 3, lines 47-53); feed lines and discharge lines for the diluate, concentrate, and electrode rinsing solution (Figure 1); and a pressure difference of at least 3 kPa between the diluate and concentrate spaces (column 3, lines 43-46).

As to Claim 20, Sanchez et al. disclose the separation chamber divided into several diluate and concentrate spaces (4, 5).

As to Claim 21, Sanchez et al. disclose the diluate and concentrate spaces (4, 5) being separated by either porous restriction or separation membranes (2,3); connected in parallel or in series (column 5, lines 6-8); and arranged alternately between the anode and cathode space (8, 9) (column 4, lines 3-12, Figure 1).

As to Claim 22, Sanchez et al. disclose the feed and discharge lines for the diluate, concentrate, and electrode rinsing solution are arranged in separate circuits (Figure 1).

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As to Claim 24, Sanchez et al. disclose a membrane pore size from 1 to 1000 nm (column 3, lines 46-53).

As to Claim 25, Sanchez et al. disclose the membranes formed of polyacrylonitrile (column 4, lines 48-55).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

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Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claim 1-8, 12-13, and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez et al. and Gritzner, as applied to claim 1, in view of Ahlgren et al.

As to Claims 1, 3, 7-8, 12-13, 16, and 18, Sanchez et al. disclose a method for membrane electrofiltration of substances which are dissolved or dispersed in an electrolyte solution (column 2, lines 18-21) using an at least quadrupartite separation chamber (Figure 1) which comprises at least one diluate space and concentrate space (4, 5) (Column 4, lines 3-12) and a cathode and anode space (8,9), with electrodes as the cathode and anode (column 5, lines 9-11); the spaces being separated by porous membranes (2,3), especially ultrafiltration or microfiltration membranes (column 3, lines 47-53); an electrode rinsing solution being circulated through the electrode spaces (column 5, lines 11-16), the diluate being circulated through the diluate space, and the concentrate being circulated through the concentrate space (6, 7); dissolved or dispersed substances are manipulated by means of an electric field applied between the anode and cathode (column 4, lines 3-16), with a pressure difference of at least 3 kPa between the diluate and concentrate space (column 3, lines 43-46).

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Sanchez et al. discloses manipulating the dissolved or dispersed substance using an electric field, but do not disclose transferring the substance in the diluate from the diluate to the concentrate space.

Gritzner disclose a method of electrophoretic separation by transferring dissolved substances across the membrane (column 1, line 62 through column 2) and preventing liquid transfer across the membranes by using leveling tanks (column 5, lines 21-34) since fluid transfer across the membrane creates cross-contamination (column 5, lines 62-67)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of electrofiltration as disclosed by Sanchez et al. by using the method of electrophoretic separation as disclosed by Gritzner because both methods utilize similar elements (column 2, lines 11-36), except the method of Gritzner allows for separation of particles by maintaining separation of liquid among the compartments and moving the particles across the membrane by electrophoresis, as opposed to moving the liquid across the membrane (column, line 62 through column 2, lines 10), which provides a dual separation and concentration function (column 2, lines 45-47).

As to Claim 2, Sanchez et al. disclose a pressure difference of at least 3 kPa between the diluate and concentrate space (column 3, lines 43-46).

Sanchez et al. do not disclose the pressure difference between the diluate space and the concentrate space being sufficient to prevent liquid flow through the membrane.

Gritzner disclose controlling the pressure difference in order to prevent liquid flow across a membrane in order to prevent cross-contamination and dilution by mass through the membrane (column 5, lines 62-68).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the method of using pressure to prevent liquid transfer as disclosed by Gritzner for the method of Sanchez et al. because pressure preventing liquid transfer across the membrane can cause cross-contamination and dilution by mass transport through the membrane when trying to separate particles by the method of Gritzner by maintaining separation of liquid among the compartments and moving the particles across the membrane by electrophoresis, as opposed to moving the liquid across the membrane as disclosed by Sanchez et al.

As to Claim 3, Sanchez et al. disclose the separation chamber containing a separation module comprising several alternating diluate (5) and concentrate (4) spaces, positioned between the anode and cathode spaces (8,9), and separated by ultrafiltration or microfiltration membranes (2,3) (Figure 1, column 1, lines 15-20), and operated in parallel or in series (column 5, lines 6-8).

As to Claims 4, 5, and 6, Sanchez et al. do not disclose the diluate and concentrate solutions being temperature controlled by cooling coils, and independently of each other by pumps.

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Gritzner disclose the diluate and concentrate solutions being temperature controlled by cooling coils (29, 31), and both are controlled independently of each other by pumps (32, 34) (Figure 3, column 4, lines 52-56).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the cooling coils of Gritzner for the method of Sanchez et al. because it can allow for output streams of any desired temperatures (column 8, lines 6-8), especially since they could be recycled back through the system (column 4, lines 52-56).

As to Claim 7, Sanchez disclose the membranes having a pore size from 1 to 1000 nm (column 3, lines 47-53).

As to Claim 8, Sanchez disclose the membranes being formed of polyacrylonitrile (column 4, lines 50-55).

As to Claims 12 and 13, Sanchez et al. disclose the current density, based on the area of the individual membranes, being less than 40 ma/cm^2 , where 40 ma/cm^2 is equal to 400 A/m^2 (column 3, lines 40-46).

As to Claim 16, Sanchez et al. disclose lowering the conductivity of the diluate solution during separation (Figure 8, column 7, lines 8-10).

As to Claim 18, Sanchez disclose the substances being a protein (column 7, lines 11-15).

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez et al. and Gritzner, as applied to claim 1, in view of Ahlgren et al.

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As to Claim 9, Sanchez et al. do not disclose the electrode rinsing solution being passed through the anode and cathode space independently of each other.

Ahlgren et al. disclose the electrode rinsing solution (20, 21) being passed through the anode and cathode space independently of each other (column 4, lines 59-65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electrode rinse distribution as disclosed by Sanchez et al. by using the independent anode and cathode solutions of Ahlgren et al. because it would allow for use of different rinse solutions for the anode and cathode

9. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez et al. and Gritzner, as applied to claim 1, in view of Ahlgren et al. and Perry et al.

As to Claim 10, Sanchez et al. do not disclose using a combination of acid and base for the electrolyte solution.

As to Claim 10, Ahlgren et al. disclose the electrode rinsing solutions being comprised of dilute sulphuric acid (column 4, lines 65).

As to Claims 10 and 11, Perry et al. disclose using a buffer solution throughout the system comprising of N-morpholino-ethane sulfonic acid (column 16, lines 3-16).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electrolyte solution of Sanchez et al.

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by using the electrolyte solutions of Ahlgren et al. and Perry et al. because the pH can be controlled.

As to Claim 17, Sanchez disclose concentrating a substance in a solution by microfiltration or ultrafiltration (column 1, lines 15-20).

Gritzner disclose concentrating the diluate solution after the separation, and then returning it to the diluate space (column 3, lines 6-22, column 4, line 57 through column 5, line 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Sanchez et al. by the method of Gritzner et al. by recycling the dilute stream in order to further concentrate the stream.

10. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez et al. and Gritzner, as applied to claim 1, in view of Perry et al.

As to Claims 14 and 15, Sanchez et al. do not disclose the conductivity of the diluate solution being from 0.1 mS/cm to 10 mS/cm.

Perry et al. disclose the conductivity of the diluate solution being 105 micro-mho/ cm, which is 1.05 mS/cm (column 14, lines 12-17).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the conductivity of Sanchez et al. by using the conductivity of Perry et al. because it will minimize Joule heating of the solution so that a given field strength can be maintained (column 4, lines 34-39).

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11. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez et al., as applied to claim 19, in view of Gritzner.

12. As to Claim 23, Sanchez et al. do not disclose heat exchangers in at least one circuit.

Gritzner disclose heat exchangers (24) in at least one circuit (column 4, lines 25-31, Figure 3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Sanchez et al. by using the heat exchangers of Gritzner et al. because the cooling streams may be recycled, which would require them to be re-cooled to the desired temperature.

13. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez et al. in view of Ahlgren et al.

As to Claim 26, Sanchez et al. do not disclose the electrode rinsing circuit comprising separate anode and cathode rinsing circuits.

Ahlgren et al. disclose the electrode rinsing solution (20, 21) being passed through the anode and cathode space independently of each other (column 4, lines 59-65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electrode rinse distribution as disclosed by Sanchez et al. by using the independent anode and cathode solutions of Ahlgren et al. because it would allow for use of different rinse solutions for the anode and cathode.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allison L. Watts whose telephone number is (571) 272-6640. The examiner can normally be reached on Monday through Friday, 9:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

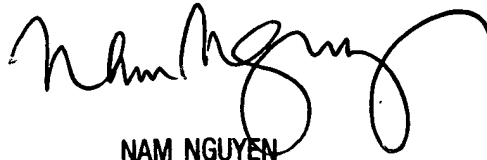
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ALW
2/2/2007

A handwritten signature in black ink, appearing to read 'Nam Nguyen', with a large, stylized loop at the end.

NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700